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EXAMINER	
AFZALI, SARANG	
ART UNIT	**PAPER NUMBER**
3726	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/767,478	Applicant(s) NG, SOR TIN
	Examiner Sarang Afzali	Art Unit 3726

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment filed 11/1/2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) *30-34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07/12/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The applicant's amendment filed on 11/01/2006 has been fully considered and made of record.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5, 7, 10, 14, 15, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasz et al. (US 6,302,318) in view of Rowe et al. (US 5,522,134).

As applied to claims 1, 10, and 25, Hasz et al. teach a method for repairing a gas turbine component wherein a multi layered preform including a first layer (wear coating foil) and a second layer (braze foil) made from different materials is provided and is joined (by heating, col. 6, line 37-38) to an article (gas turbine component) (col. 4, line 67, col. 5, lines 1-2). Hasz et al. teach the invention cited with the exception of explicitly teaching that the preform is a rigid sintered preform.

However, Rowe et al. teach a method of refurbishing/restoring a turbine vane including the step of providing a rigid sintered preform (10, Fig. 1) made of a two component system material having a nickel-based base material and a high melt, high strength braze material (col. 3, lines 45-51) to a surface (54, Fig. 3) of an airfoil (52, Fig.

3) resulting in a high density material with little shrinkage and a substantially uniform microstructure (col. 3, lines 53-55 of Rowe et al.).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Hasz's preform material as a rigid sintered material, as taught by Rowe et al., in order to provide an effective and defect-free bonding of the repaired material to the gas engine component (article) that would result in a high density material with little shrinkage and substantially uniform microstructure without any consideration for thickness variation (col. 3, lines 53-57).

As applied to claim 25, Hasz et al. teach a method wherein a multi layered preform including a first layer (wear coating foil) made of a material similar to the article and a second layer (braze foil) made from different materials is provided and is joined to an article (gas turbine component) (col. 4, line 67, col. 5, lines 1-2).

Note that Hasz et al. teach that the base substrate (article) is nickel based and also teach that the first layer (wear coating metal foil) is Nickel carbide (col. 2, lines 44 and 53-54 and claims 12 and 13) and therefore of similar materials. Also, note that Hasz et al. teach that the second layer (braze foil) is of a different type (col. 4, lines 38-43).

As applied to claim 2 and 14, Hasz et al. teach a method wherein the first layer (wear coating foil) of the preform includes a nickel-based alloy (col. 3, line 32).

As applied to claims 3 and 15, Hasz et al. teach a method wherein the second layer (braze foil) of the preform includes a nickel-based alloy (col. 4, lines 31-33) and a second alloy (col. 4, lines 35-43).

As applied to claim 5, Hasz et al. teach a method wherein the thickness of first layer of the preform (wear coating foil) is between about 0.005 inch and about 0.015 inch (col. 6, lines 54-55).

Note that the range of about 25 microns to about 1300 microns is equivalent to 0.001 inch to 0.05 inch.

As applied to claim 7, Hasz et al. teach a method wherein the joining step includes subjecting the article and preform to heat, wherein the preform melts to conform to the shape of the article.

Note that Hasz et al. teach the heating step by brazing which results bonding and conforming of the preform to the shape of the article.

Furthermore, the claim limitation does not preclude the teaching step of Hasz et al. wherein a preform can be provided in desirable shape to conform to the shape of the article even prior to the bonding process and therefore after bonding the preform still conforms to the shape of the article.

4. Claims 25-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rafferty et al. (US 5,523,169) in view of Rowe et al.

As applied to claim 25, Rafferty et al. ('169) teach a method of repairing an article (jet engine component) by providing an article made of nickel based superalloy and proving a two-layered composite preform having a first layer of a material similar to the article and a second layer different than the first layer and joining the preform to the

article (col. 3, lines 41-53). Rafferty et al. ('169) teach the invention cited with the exception of explicitly teaching that the preform is a rigid sintered preform.

However, Rowe et al. teach a method of refurbishing/restoring a turbine vane including the step of providing a rigid sintered preform (10, Fig. 1) made of a two component system material having a nickel-based base material and a high melt, high strength braze material (col. 3, lines 45-51) to a surface (54, Fig. 3) of an airfoil (52, Fig. 3) resulting in a high density material with little shrinkage and a substantially uniform microstructure (col. 3, lines 53-55).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Rafferty et al. ('169) preform material as a rigid sintered material, as taught by Rowe et al., in order to provide an effective and defect-free bonding of the repaired material to the jet engine component (article) that would result in a high density material with little shrinkage and substantially uniform microstructure without any consideration for thickness variation (col. 3, lines 53-57 of Rowe et al.).

As applied to claims 26-28, Rafferty et al. ('169) teach a method of repairing an article (jet engine component) by providing an article made of nickel based superalloy and proving a two-layered composite preform having a first layer of a material similar to the article and a second layer different than the first layer and joining the preform to the article (col. 3, lines 41-53). Rafferty et al. ('169) teach the invention cited with the exception of explicitly teaching that the preform is a rigid sintered preform (claim 25).

As applied to claims 26 and 27, Rafferty et al. ('169) teach that the first layer material is both similar to and same as the material of the article (col. 3, line 45-46) and

since the material of the article is a nickel based, then the material of first layer is nickel based.

As applied to claim 28, Rafferty et al. ('169) teach that the second layer is made of two components, the fibrillated polytetrafluoroethylene and the diffusion braze alloy wherein the brazing alloy is nickel based alloy and a second alloy (col. 4, Table, item 8).

As applied to claim 29, Rafferty et al. ('169) teach that the braze material is a transient liquid phase alloy (diffusion braze alloy, col. 3, lines 48-49).

5. Claims 4, 6, 8, 9, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasz et al. in view of Rowe et al. as applied to claims 1 and 10 above, and further in view of Draghi et al. (US 4,726,101).

As applied to claims 4 and 16, Hasz et al./Rowe et al. teach that a variety of braze alloy (second layer of the preform) composition may be used (see Hasz et al., col. 4, lines 27-28) and may also contain other compositions such as silicon and/or boron which serve as melting point suppressants (see Hasz et al., col. 4, lines 35-37) in the brazing process. It is also well-known in the art that transient liquid phase (TLP) bonding is considered a diffusion bonding. Therefore, Hasz et al./Rowe et al. teach the brazing bonding and also teach that second layer (braze layer) includes a second alloy such as boron to facilitate a brazing (TLP bonding).

In alternative, if applicant does not agree that Hasz et al./Rowe et al. teach the TLP alloy, Draghi et al. teach a multi layered preform bonded to a surface of turbine

vane by TLP bonding as an effective means of bonding a preform to a base substrate to form a continuous, void free microstructure (col. 4, lines 12-14).

It would have been obvious to one of ordinary skill in the art at the time of invention to have included Hasz et al./Rowe et al.'s preform material with a transient liquid phase alloy, as taught by Draghi et al., to provide an effective and defect-free bonding to the base substrate.

As applied to claims 8 and 9, Hasz et al./Rowe et al. teach the claimed invention including that the article is a turbine engine component, which meet the limitations of airfoil and turbine vane.

In alternative, if applicant does not agree that Hasz et al./Rowe et al. teach the article being an airfoil and turbine vane, Draghi et al. teach a multi layered preform bonded to a surface of turbine vane (1) (see Figure) in order to reclassify turbine vanes which reduces the amount of labor required to provide a build up of an alloy at a specific location of the turbine vane surface (col. 2, lines 42-46).

It would have been obvious to one of ordinary skill in the art at the time of invention to have selected a turbine vane as Hasz et al./Rowe et al.'s turbine engine component, as taught by Draghi et al., to provide a necessary repair to a worn or damaged wear coating.

As applied to claim 6, Hasz et al./Rowe et al. teach the claimed invention with the exception of the thickness range for the second layer of the preform.

However, Draghi et al. teach that the layer (tape layer 14) bonded by transient liquid phase method to a base substrate (turbine vane 1, Figure) has a uniform

thickness of 0.020 inches (col. 4, lines 54-55) in order to provide a unitary thickness surface with the tape material (first layer) concurrently filling any cracks in the reclassification area (col. 5, lines 3-5).

It would have been obvious to one of ordinary skill in the art at the time of invention to have made the second layer of the preform of Hasz et al./Rowe et al.'s with a suitable thickness, as taught by Draghi et al., to provide an effective and defect-free bonding of the preform layers to the base substrate.

6. Claims 17-20 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasz et al. in view of Rowe et al. and Draghi et al.

As applied to claim 17, Hasz et al. teach providing a gas turbine component section requiring dimensional restoration; providing a preform having first and second layers made from different materials; preparing the component section for attachment of the preform thereto; placing the preform adjacent a side of the airfoil; and subjecting the component section to heat so as to cause the preform to soften and conform to the component section. Hasz et al. teach the claimed invention with the exception of explicitly teaching that the preform is a rigid sintered preform and that preform is placed adjacent to a convex side of the airfoil.

Rowe et al. teach a method of refurbishing/restoring a turbine vane including the step of providing a rigid sintered preform (10, Fig. 1) made of a two component system material having a nickel-based base material and a high melt, high strength braze material (col. 3, lines 45-51) to a surface (54, Fig. 3) of an airfoil (52, Fig. 3) resulting in

a high density material with little shrinkage and a substantially uniform microstructure (col. 3, lines 53-55).

Draghi et al. teach a method for repairing a vane of a gas turbine airfoil wherein a multi layered preform is provided and placed and joined (by heating, col. 4, lines 8-9) to an airfoil (gas turbine vane 1, see Figure) at the convex surface (3) side such that the preform softens and conforms to the airfoil (see Figure) to provide a controlled buildup to a precise requirement and achieve a homogenous substrate alloy configuration (col. 5, lines 25-27).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Hasz's preform material as a rigid sintered material, as taught by Rowe et al., in order to provide an effective and defect-free bonding of the repaired material to the gas engine component (article) that would result in a high density material with little shrinkage and substantially uniform microstructure without any consideration for thickness variation (col. 3, lines 53-57 of Rowe et al.).

It also would have been obvious to one of ordinary skill in the art at the time of invention to have selected a turbine vane as Hasz's turbine engine component, as taught by Draghi et al., to provide a necessary repair to a worn or damaged wear coating.

As applied to claim 18, Hasz et al. teach the step of preparing includes removing any protective coatings on the turbine component (col. 6, lines 29-30).

As applied to claim 19, Hasz et al./Rowe et al. teach the invention cited with the exception of the cleaning step.

However, Draghi et al. teaches that the vane is hydrogen and vacuum cleaned before applying the preform on it (col. 4, lines 51-53). It would have been obvious to one of ordinary skill in the art at the time of invention to have modified Hasz et al. with the cleaning step of the vane surface as taught by Draghi et al. in order to provide an effective bonding between the preform and the surface of the turbine component.

As applied to claim 20, Hasz et al. teach the step of heating the preform and the turbine component is heated in a furnace (col. 5, lines 44-45).

As applied to claim 22, Hasz et al. teach a method wherein the first layer (wear coating foil) of the preform includes a nickel-based alloy (col. 3, line 32).

As applied to claims 23, Hasz et al. teach a method wherein the second layer (braze foil) of the preform includes a nickel-based alloy (col. 4, lines 31-33) and a second alloy (col. 4, lines 35-43).

As applied to claim 24, Hasz et al. teach that a variety of braze alloy (second layer of the preform) composition may be used (col. 4, lines 27-28) and may also contain other compositions such as silicon and/or boron which serve as melting point suppressants (col. 4, lines 35-37) in the brazing process. It is also well-known in the art that transient liquid phase (TLP) bonding is considered a diffusion bonding. Therefore, Hasz et al. teach the brazing bonding and also teach that second layer (braze layer) includes a second alloy such as boron to facilitate a brazing (TLP bonding).

In alternative, if applicant does not agree that Hasz et al. teach the TLP alloy, Draghi et al. teach a multi layered preform bonded to a surface of turbine vane by TLP

bonding as an effective means of bonding a preform to a base substrate to form a continuous, void free microstructure (col. 4, lines 12-14).

It would have been obvious to one of ordinary skill in the art at the time of invention to have included Hasz's preform material with a transient liquid phase alloy as taught by Draghi et al. to provide an effective and defect-free bonding to the base substrate.

7. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasz et al. in view of Rowe et al. as applied to claim 10 above, and further in view of Chesnes (US 6,365,285).

As applied to claims 11 and 12, Hasz et al./Rowe et al. teach the claimed invention including the temperature range that the article and the preform are subjected to (see Hasz et al., col. 5, lines 34-39). However, Hasz et al./Rowe et al. fail to explicitly teach the duration of the heating steps.

Chesnes teaches a method of using an improved braze alloy composition for repairing superalloy articles such as gas turbine engines (Abstract, lines 1-3) wherein the heating step is up to 2350° Fahrenheit maintained between 15 and 45 minutes (col. 3, lines 66-67, col. 4, lines 1-4) in order to provide an improved diffusion heat treatment method to break down the undesirable phases formed by the melting point depressant and diffuse the depressants into the base metal alloy matrix (col. 3, lines 44-47).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Hasz et al./Rowe et al. with the heating temperature and

duration, as taught by Chesnes, in order to provide an effective diffusion bonding of the preform with the base substrate (airfoil).

Note that Chesnes' heating duration of between 15 and 45 minutes meets the limitation of between about 2125° to about 2155° for 15 minutes or less and thereafter for 6 ½ hours or less.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hasz et al. in view of Rowe et al. and Chesnes as applied to claim 12 above, and further in view of Rafferty et al. (US 6,004,683).

As applied to claim 13, Hasz et al./Rowe et al./Chesnes teach the claimed invention including the temperature range that the article and the preform are subjected to with the exception of the heating duration of about 2 hours.

However, Rafferty et al. ('683) teach a method of repairing a base metal by brazing a two layered preform on top of it wherein the braze heating step occurs at temperature of at least 800° F to 2300° F maintained for 30 minutes to 3 hours, preferably 2 hours in order to provide a higher quality repair, more closely approaching base metal properties (col. 5, lines 19-30).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Hasz et al./Rowe et al./Chesnes with the heating temperature and duration, as taught by Rafferty et al. ('683), in order to provide an effective diffusion bonding of the preform with the base substrate (airfoil).

9. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hasz et al. in view of Rowe et al. and Draghi et al. as applied to claim 20 above, and further in view of Schaeffer et al. (US 5,674,610).

As applied to claim 21, Hasz et al./Rowe et al./Draghi et al. teach the claimed invention with the exception of the convex side of the airfoil facing upwards during the heating step.

However, Schaeffer et al. teach a method for applying a multi layered preform coating (60 including layers 62 and 64, Fig. 6) to a turbine vane (substrate 32, Fig. 6) wherein the coating (60) attached on top of the substrate (32) are facing upward when placed in the container (70, Fig. 6, col. 6, lines 34-41) and heated (Fig. 3, numeral 48, col. 7, lines 29-30) to prevent formation of any further oxide during heating and chromium deposition (col. 6, lines 65-66). It would have been obvious to one of ordinary skill in the art at the time of invention to have oriented the turbine component of Hasz et al./Rowe et al./Draghi et al. in an upward position during the heating step, as taught by Schaeffer et al., in order to provide an effective and secure bonding between the preform and the turbine vane.

Response to Arguments

10. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sarang Afzali whose telephone number is 571-272-8412. The examiner can normally be reached on 7:00-3:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bryant can be reached on 571-272-4526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic

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SA
1/19/2007

DAVID P. BRYANT
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1/22/07